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THE BUTTERFLY FAUNAS OF SAN ANDRES AND PROVIDENCIA ISLANDS IN THE WESTERN CARIBBEAN

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SAN ANDRES ISLAND AND PROVIDENCIA ISLAND are the westernmost islands in the West Indies, lying only about 120 miles east of the Nicaraguan coast. Both islands are located beyond the 100 fathom level (Fig. 1), however, in the western Caribbean and there is no evidence for submerged banks between the islands and the mainland that might have supported butterflies or other organisms during a past period of lowered sea level (Corn and Dalby, 1973). Thus this isolated pair of islands and associated tiny cays are of considerable interest in considering the colonization and evolution of island butterflies in the West Indies, and despite excellent recent reviews of Antillean butterfly zoogeography (Scott, 1971, 1972), there has been no published survey of the San Andrés and Providencia butterflies.

In company with other faculty and students in the Organization for Tropical Studies, Inc. course program in Costa Rica, I was able to make five visits to these islands at various times in the dry and wet seasons of 1967 and 1968. I collected on San Andrés during March 25-26 and July 22-30, 1967, and February 19-23, June 21-24, and July 15-22, 1968; collecting on Providencia was done on June 2 and July 20-21, 1968. The records of butterfly species in this report come entirely from this collecting. Specimens are deposited in the Florida State Collection of Arthropods and the author's personal collection.

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DESCRIPTION OF THE ISLANDS

San Andrés and Providencia lie approximately 202 and 240 km, respectively, east of Nicaragua. For historical reasons, both islands are possessions of the country of Colombia. San Andrés ($120^{\circ} 35' \text{ N}$, $81^{\circ} 42' \text{ W}$), the more southerly of the two islands, is about 13 km long and 3 km wide. The relief is comparatively gentle, with a central hill rising to a maximum height of about 104 m (338 feet) above sea level. The island is completely covered by a layer of hard limestone, although underneath it is assumed to be basically volcanic. Several freshwater ponds (the largest of which is known as "Big Pond," placed at the island's center) are present. Most of the island is presently devoted to the cultivation of coconut palms and Colombian tourism, and the human population density is great (17,000 residents in 1967—distributed over the 16 square miles of island area). During the 17th and 18th centuries, however, there apparently were extensive natural stands of "cedar," possibly *Cedrela odorata* in the family Meliaceae (Whitmore and Hartshorn, 1969), which were decimated by the early colonists.

Providencia ($13^{\circ} 21' \text{ N}$, $81^{\circ} 22' \text{ W}$) is located about 88 km NNE of San Andrés and differs markedly from it in vegetation, topography and superficial geology. Approximately 8 km long and 5 km wide, it is a high, rugged island of andesite and basalt, with steep, rocky, central peaks rising to 363 m (1100 feet) above sea level. No freshwater ponds are found; however, several streams descend from the peaks. They may become intermittent during the dry season (January-April). In the higher regions of Providencia, bracken and tree ferns are common, and in the steeper uncleared areas occur dense thickets of figue (*Fourcroya* sp.), calabash (*Crescentia* sp.), and other trees. Coconut palms are found only infrequently, and there are few agricultural areas; introduced guinea grass (*Panicum maximum*) supports some cattle in the lower valleys. Extensive mangrove swamps occupy a considerable portion of the northeast shore. Few tourists visit this island, the transportation being infrequent and the facilities minimal.

The climate on both islands is tropical, with the average daily temperature being about 27°C throughout the year. The dry season, as in Central America, lasts from January to April, March and April being the driest months. October and November are normally the wettest months. The average annual rainfall on San Andrés between 1934 and 1943 was 1824 mm (71.81 inches).

The interglacials of the Pleistocene Epoch would have considerably decreased the surface area of low-lying San Andrés. The glacial periods, however, clearly greatly modified the surface areas of both islands, as indicated by the extensive and massive coral reefs and shoals bordering parts of each island. Providencia lies 74 km, and San Andrés 83 km, from the 100 fathom depth line off mainland Central America. Soundings of trenches as deep as 1500 m have been taken between the two islands.

THE BUTTERFLIES OF SAN ANDRÉS

Fifteen species of butterflies were taken or observed on this island. Most were distributed generally around the island, as were the seven species of dragonflies recorded earlier by Paulson (1968). No Papilionidae, Satyridae, Libytheidae, Riodinidae, or Megathymidae were found. It is strange that *Heliconius charitonius* and *Euptoieta hegesia* are apparently absent. A list of recorded species follows.

DANAIDAE

1. *Danaus plexippus* Linnaeus.

Scattered and relatively worn individuals were seen on all dates. No milkweeds were seen on this island.

NYMPHALIDAE

1. *Dryas julia* Fabricius.

A number of subspecies of this long-winged heliconian have been named from various Caribbean islands (and mainland areas), for the species seems to vary distinguishably from island to island (see Brown and Heineman, 1972, for a partial review). No special name is presently assigned to the San Andrés-Providencia populations.

Dryas flies in fair abundance on the slopes around Big Pond throughout the year and is continuously brooded here and elsewhere on San Andrés with fresh adults appearing every month. *Dryas* is relatively rare at Puerto la Ensenada, on the central west coast of San Andrés. On 21 February 1968, two *Dryas* males were observed courting different *Agraulis vanillae* females around 0900 and 0915 hours, in low second-growth vegetation. Female *Dryas* have a dark blackish band across the forewings, while males rarely have any indication of this band.

2. *Agraulis vanillae* Linnaeus.

Rare in the Big Pond area (where *Dryas* is abundant), the Gulf Fritillary is quite abundant at Puerto la Ensenada on the west coast (24 adults in an hour in February). It resembles typical Florida *A. v. nigrior*, although the black forewing spots often form a bar-like continuous row. Young larval instars were found on *Passiflora* sp. at the Puerto area.

3. *Victorina (Siproeta) stelenes* (Linnaeus).

Several fresh specimens were observed (Big Pond area, Hotel Casa Blanca) each day in February, but it was rarer in other months. The species is known to feed on *Blechnum blechnum* and *Ruellia coccinea* (Acanthaceae) in Jamaica (Brown & Heineman, 1972); these are weedy plants which may well occur on San Andrés.

4. *Historis odius* Fabricius.

A robust, strong-flying nymphalid, *Historis* is a rare sight on San Andrés (July 1967, 1968) but its black and orange-brown coloration is unmistakable. The few adults seen may be strays from Providencia or even the mainland because its only known foodplants are trees of the genus *Cecropia*, a member of the Urticaceae and characteristic inhabitant of lowland rain forest areas in the New World tropics.

5. *Precis evarete zonalis* Felder & Felder.

The West Indian buckeye is a medium-sized dark brown butterfly with small hindwing ocelli. It also occurs on the mainland from northern Mexico and the southern tip of Florida south to Venezuela and Trinidad. It is relatively rare on San Andrés and occurs principally in the Big Pond area (February, July).

6. *Anartia jatrophae* Johansson.

This nymphalid is quite variable through its Neotropical range, and the species also shows seasonal variation in color and pattern. It prefers weedy areas and is fairly common in July, but rare in February.

PIERIDAE

1. *Phoebis sennae sennae* (Linnaeus).

This large, rich yellow Cloudless Sulphur has scattered patches or lines of reddish brown scales on the underside of the hindwing. Fresh specimens were seen daily, but

the species is not particularly common in February, March or July. A low-growing weedy *Cassia* (larval foodplant) is found on the coastal margins and around Big Pond.

2. *Eurema daira* Godart.

This variable *Eurema*, common in the Antilles and on the mainland in Nicaragua and Costa Rica, is relatively rare on San Andrés; it was recorded daily in July but not in February. The larvae feed elsewhere on vetches and other related Fabaceae. The species is known to be migratory in Costa Rica.

3. *Eurema lisa* Boisduval & Leconte.

The Little Sulphur is also comparatively rare on San Andrés and was noted only during the wet season in July (T.C.E., G. N. Ross). Its larval host are *Mimosa* and *Cassia*; both present on San Andrés.

LYCAENIDAE

1. *Leptotes cassius* (Cramer).

A very common blue throughout the West Indies, this *Leptotes* is quite colonial on San Andrés. A large population exists slightly north of Puerto la Ensenada, centered around low beach legumes, while none were found at Big Pond or around the settlements with the exception of one male seen visiting flowers at the Hotel Casa Blanca.

HESPERIDAE

1. *Urbanus proteus* (Linnaeus).

This dark long-tailed skipper, with iridescent greenish-blue wing-scaling near and on the thorax, is common on the island and the adjacent mainland. Gravid females with mature eggs were found in both February and July at Big Pond, where the species was using unidentified low-growing legumes as larval hosts.

2. *Pyrgus oileus* (Linnaeus).

The former name of this common checkered skipper in the Caribbean was *P. syrichtus* (Brown & Heineman, 1972). *Pyrgus oileus* was seen sporadically around Big Pond (February 1968).

3. Small brown skipper, possibly female *Hylephila phyleus* (see Providencia list).

One was seen but not captured, along road above the east side of Big Pond on 22 February 1968.

4. Small black skipper (body length 9 mm).

One specimen was taken in a sweeping study of grass-inhabiting insects under coconut palms, near the trail going up from the east side of Big Pond, at 1000 hours on 22 February 1968. Unfortunately, it was so damaged by debris in the sweep net that identification was impossible.

THE BUTTERFLIES OF PROVIDENCIA

Local inhabitants suggested that butterflies on this island were at their peak later in the wet season than when collecting was done in the present study (June and July). From personal observation, I would agree that the flight peak for resident species is probably more marked than on San Andrés and that good population numbers likely do not appear until August through October or November. Every species found on San Andrés also must occur on Providencia, and with the greatly increased diversity of vegetation on Providencia, one would presume that several additional species of butterflies should occur. The discovery of a second *Phoebis* species and another skipper species, even with very little sampling time, supports this view. Most of the records reported here were obtained on the southern and western coastal and moderate-elevation areas.

DANAIDAE

1. *Danaus plexippus*.

NYMPHALIDAE

1. *Dryas julia*.
2. *Agraulis vanillae*.
3. *Historis odius*.

PIERIDAE

1. *Phoebis sennae*.
2. *Phoebis statira* Cramer.

A large *Phoebis* with the basal two-thirds of the wing yellow and the outer third covered with whitish scaling, *P. statira* is a pandemic species in the Caribbean area and its migratory behavior is well known. Though only two males were seen in July, the presence of its *Cassia* food-plants likely means it is a breeding resident on at least Providencia if not also on the more arid island of San Andrés.

LYCAENIDAE

1. *Leptotes cassius*.

HESPERIIDAE

1. *Hylephila phyleus phyleus* (Drury).

The Fiery Skipper is found throughout the West Indies and North, Central, and South America. It is common on Providencia in lush grassy areas from sea level to over 800 feet elevation.

DISCUSSION

A total of 17 species of true butterflies and skippers were found on San Andrés and Providencia Islands, located about 120 miles east of the coast of Central America. No endemic species occur on these isolated West Indian islands, nor are there any uniquely Antillean residents. All of the butterflies are also found on the adjacent Nicaraguan mainland area, and all represent species that are migratory or are known to be frequent colonizers. This situation is typical of the Antilles as a whole, where more than 60 percent of the relatively impoverished butterfly fauna of 285 species are widespread continental species of great dispersal ability (Scott, 1971, 1972). Further collecting in the high interior of Providencia and during the wet season will undoubtedly uncover several additional resident species of butterflies and skippers.

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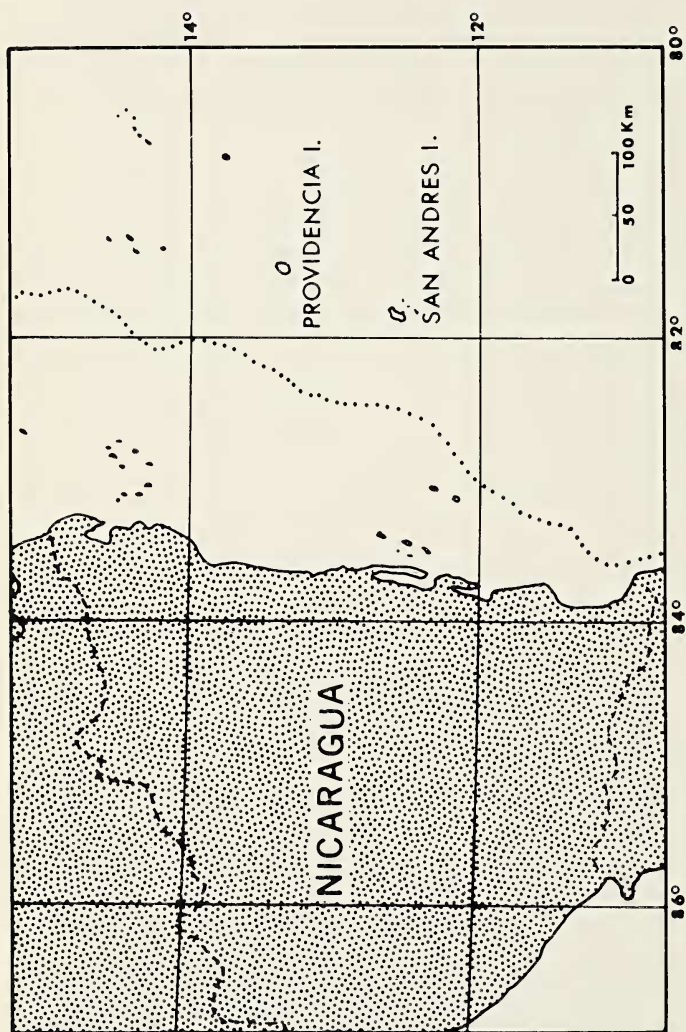


Fig. 1.—The position of San Andrés and Providencia Islands, Colombia, in the western Caribbean in relation to Nicaragua on the mainland of Central America. The 100-fathom depth level of the ocean is indicated by a dotted contour line.